

Trend Study 22-13-03

Study site name: Minersville Reservoir.

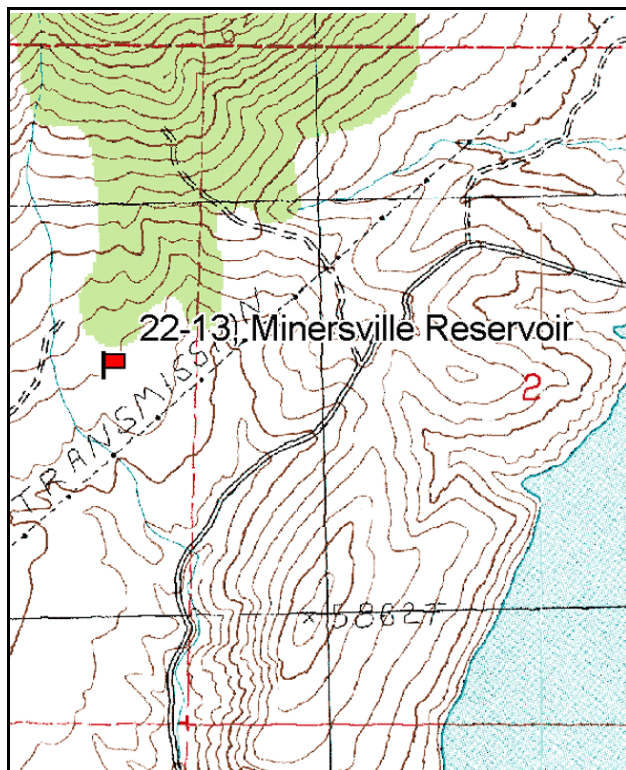
Vegetation type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 172 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

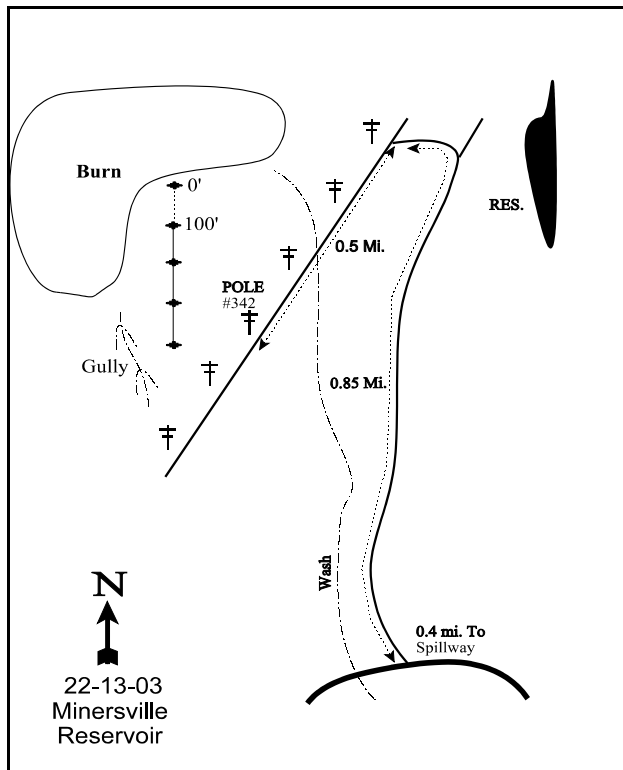
LOCATION DESCRIPTION

From Beaver go west on SR 21 to Minersville Reservoir. From the Minersville Reservoir sign south of the reservoir, drive 1.35 miles further west on SR 21 to an intersection with a dirt road. Turn right and go 0.85 miles. Take a left onto the road that takes you under the powerlines. Go 0.4 miles down across a wash and up a small hill to powerpole #342 (single pole). From the pole, the 0' stake is ~600 feet at 317 degrees magnetic. The 0-foot baseline stake is marked by browse tag #7185. The 0', 100' and 200' stakes are rebar; the 300' and 400' stakes are green, half-high fenceposts.



Map Name: Minersville

Township 30S, Range 9W, Section 3



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4232572 N, 338474 E

DISCUSSION

Minersville Reservoir - Trend Study No. 22-13

This study was established to monitor trend on a small area of critical deer winter range located about 3/4 of a mile west of Minersville Reservoir. The site slopes (percent slope 6-8%) to the south-southeast at an elevation of 5,700 feet. Historically, the site sampled an open sagebrush flat with scattered Utah juniper. However, the site burned in 1998 right after it was surveyed that summer. Following the burn, the site was aerially seeded and smooth-chained to cover the seed in October of 1998. The seed mix consisted of 9 grass and 4 forb species including several wheatgrass species, Indian ricegrass, small burnet, alfalfa, Lewis flax, and Palmer penstemon. A second aerial seeding was done in February 1999 which included 2 crested wheatgrass varieties, forage kochia, and Wyoming big sagebrush. Some kochia has established in the area but none was sampled on the trend study site. Use by both livestock and mule deer was reported to be moderate in 1985. In 1991, 17 deer days use/acre (42 ddu/ha) was determined with little sign of livestock being observed. Abundant coyote sign was observed in both years. A pellet group transect read on site in 1998 estimated 62 deer days use/acre (153 ddu/ha) and 3 cow days use/acre (8 cdu/ha). Data from 2003 estimated 9 deer days use/acre (23 ddu/ha) and 20 cow days use/acre (50 cdu/ha). Decreasing deer use in 2003 is not surprising with the loss of most of the Wyoming big sagebrush population following the fire. Prior to the burn, thermal and escape cover were provided by dense junipers on the hillside north of the study site. Following the burn, only a few pockets of unburned trees remain in the area.

Soil analysis indicates a sandy clay loam texture with a slightly acidic pH (6.3). A caliche layer occurs at a depth of about 10-12 inches. Effective rooting depth averaged 11 inches in 1998. Average soil temperature was estimated at 65.6°F at 10 inches in 1998 and 67°F in 2003. Ground cover characteristics showed significant changes between 1998 and 2003. These changes are the result of the burn as well as very dry conditions in 2002 and 2003. The biggest change on the soil surface following the burn was the loss of litter cover and the corresponding increase in bare ground. Vegetation cover also declined in 2003 but not to the same magnitude as litter. Prior to the burn, some signs of erosion were apparent, but erosion did not appear to be accelerated. In 2003, soils were rated as stable from an erosion condition class assessment. There are some moderately large active gullies near the site. The main factor limiting vegetative growth is the low amount of annual precipitation (10 to 12 inches) caused by the rain shadow effect of mountain ranges to the east and west.

Wyoming big sagebrush was the key species prior to the 2003 survey. The sagebrush population was moderately dense, but had low reproduction and high decadence. The pre-burn sagebrush population displayed mostly light use. In 2003, only 2 Wyoming big sagebrush plants were sampled on the site resulting in an estimated population density of only 40 plants/acre. Sagebrush density will likely remain very low on the site as no young were sampled in 2003. A few scattered fourwing saltbush and ephedra were also sampled on the site in 2003.

At the time of the 1998 survey, the understory consisted almost exclusively of grasses. In 1998, cheatgrass provided 2/3 of the grass cover and was said to provide enough fine fuels to carry a very destructive fire which would wipe out the Wyoming big sagebrush population. This statement was obviously realized as the site burned only a few weeks after the transect was read in 1998. Cheatgrass significantly declined in nested frequency and average cover on the site in 2003 likely due to the dry conditions prior to sampling. Before the site burned, the most abundant perennial grasses were warm season species including purple three-awn, galleta, and blue grama. These species were again sampled after the burn in 2003, as well as several others including crested and intermediate wheatgrass, Indian ricegrass, bottlebrush squirreltail, sand dropseed, and Russian wildrye. Sum of nested frequency for perennial grasses declined between 1991 and 1998, but increased between 1998 and 2003. Forbs have been sparse in all readings. Alfalfa was sampled in 3 quadrats in 2003 as it was seeded on the site as part of the post-burn rehabilitation. An annual *Gilia* was the most

abundant forb in 2003.

1985 APPARENT TREND ASSESSMENT

The vegetative trend appears to be declining. There is very little regeneration of the sagebrush, while junipers appear to be slowly invading the site. This area is generally not considered suitable for treatment and seeding because of the rocky soil surface and low precipitation. The soil trend appears stable.

1991 TREND ASSESSMENT

The soil trend is down with a 75% decrease in vegetative basal cover and a 38% increase in bare ground. The trend for the key browse species, Wyoming big sagebrush, appears stable. Density increased by 8%, but decadence remains high and slightly increased to 45%. Twenty-three percent of the population displays poor vigor. Even though the reproductive potential increased due to the number of seedlings counted in 1991, no young sagebrush were encountered and it is not known how many of the seedlings will survive. Grass and forb trend is improving due to increased nested frequencies, but it still is considered in very poor condition.

TREND ASSESSMENT

soil - down (1)

browse - stable (3)

herbaceous understory - slightly up (4)

1998 TREND ASSESSMENT

The soil trend is down with increased bare ground and a decline in rock and pavement. This indicates that some soil movement may have occurred on the site. Litter cover also declined in 1998. The browse trend is down. Decadence in the Wyoming big sagebrush population continues to increase (51%) and the number of young in the population is not enough to replace the decadent, dying individuals. Population density of sagebrush declined by 31%. The herbaceous understory trend is slightly downward. Cheatgrass is the dominate grass and constitutes a great fire hazard which could ultimately cause the loss of the Wyoming big sagebrush. Also, sum of nested frequency of perennials has declined from 272 in 1991 to 208 in 1998.

TREND ASSESSMENT

soil - down (1)

browse - down (1)

herbaceous understory - slightly down (2)

2003 TREND ASSESSMENT

Trend for soil is down. Litter cover is less than half of the amount sampled in 1998, and bare ground doubled. Vegetation cover also declined in 2003. These changes are the result of the burn as well as dry conditions in 2003. The result of these changes is that the soil surface has less protection and erosion potential has increased. Trend for browse is down. Wyoming big sagebrush was the key browse on the site but density has declined by 99% following the burn. No young plants were sampled in 2003 and so a short recovery period is not likely. Trend for the herbaceous understory is slightly up. The seeding treatment added several perennial species to the community including crested and intermediate wheatgrass, and alfalfa. These species are not highly abundant, but they provide valuable forage and soil stability values to the site. Native warm season grasses remain the most abundant species on the site, and forbs are still scarce.

TREND ASSESSMENT

soil - down (1)

browse - down (1)

herbaceous understory - slightly up (4)

HERBACEOUS TRENDS --

Management unit 22 , Study no: 13

T y p e	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
G	Agropyron cristatum	a ⁻	a ⁻	a ⁻	b ³²	-	1.04
G	Agropyron intermedium	a ⁻	a ⁻	a ⁻	b ³²	-	1.10
G	Agropyron spicatum	-	-	-	-	-	.01
G	Aristida purpurea	56	59	33	37	1.61	1.17
G	Bouteloua gracilis	a ⁻	b ¹⁶	b ¹⁹	ab ¹²	.29	.21
G	Bromus inermis	-	-	-	1	-	.04
G	Bromus tectorum (a)	-	-	b ³⁵⁶	a ⁶²	15.16	.44
G	Elymus junceus	-	-	-	7	-	.38
G	Hilaria jamesii	c ¹³⁸	ab ⁹⁰	a ⁷²	bc ¹⁰⁹	2.92	8.55
G	Oryzopsis hymenoides	-	2	11	2	.32	.07
G	Sitanion hystrix	a ³⁴	b ⁷⁶	b ⁶⁵	a ¹¹	1.95	.52
G	Sporobolus cryptandrus	a ⁻	a ⁻	a ⁻	b ¹⁶	-	.66
G	Vulpia octoflora (a)	-	-	a ⁻	b ⁸	-	.05
Total for Annual Grasses		0	0	356	70	15.16	0.49
Total for Perennial Grasses		228	243	200	259	7.10	13.77
Total for Grasses		228	243	556	329	22.27	14.26
F	Alyssum alyssoides (a)	-	-	1	-	.00	-
F	Calochortus nuttallii	a ¹	a ⁵	a ⁶	b ¹⁸	.01	.07
F	Eriogonum cernuum (a)	-	-	-	2	-	.06
F	Gilia spp. (a)	-	-	a ⁻	b ¹⁰⁸	-	4.85
F	Leucelene ericoides	-	-	-	14	-	.60
F	Medicago sativa	-	-	-	6	-	.05
F	Phlox longifolia	a ³	b ²³	a ²	a ²	.01	.01
F	Salsola iberica (a)	-	-	-	4	-	.01
F	Sisymbrium altissimum (a)	-	-	-	2	-	.03
F	Sphaeralcea coccinea	-	1	-	6	-	.30
F	Unknown forb-perennial	3	-	-	6	-	.30
Total for Annual Forbs		0	0	1	116	0.00	4.95
Total for Perennial Forbs		7	29	8	52	0.01	1.34
Total for Forbs		7	29	9	168	0.02	6.30

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 22 , Study no: 13

Type	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	Artemisia tridentata wyomingensis	81	2	8.84	-
B	Chrysothamnus viscidiflorus stenophyllus	2	0	-	-
B	Ephedra nevadensis	0	1	.00	.15
B	Juniperus osteosperma	1	0	.06	-
B	Opuntia spp.	2	0	.03	-
B	Pinus edulis	0	0	.38	-
Total for Browse		86	3	9.31	0.15

CANOPY COVER, LINE INTERCEPT --

Management unit 22 , Study no: 13

Species	Percent Cover	
	'98	'03
Ephedra nevadensis	-	.20
Juniperus osteosperma	.80	-

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 22 , Study no: 13

Species	Average leader growth (in)
	'03
Atriplex canescens	8.9
Artemisia tridentata wyomingensis	1.7

POINT-QUARTER TREE DATA --

Management unit 22 , Study no: 13

Species	Trees per Acre	
	'98	'03
Juniperus osteosperma	15	0
Pinus edulis	8	0

Average diameter (in)	
'98	'03
3.1	-
3.4	-

BASIC COVER --

Management unit 22 , Study no: 13

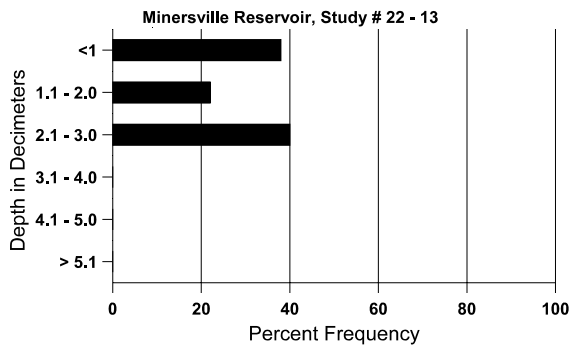
Cover Type	Average Cover %			
	'85	'91	'98	'03
Vegetation	8.00	1.75	30.53	20.13
Rock	7.00	12.00	11.05	17.53
Pavement	45.50	31.25	25.52	17.97
Litter	31.75	41.75	34.77	14.30
Cryptogams	0	0	.01	0
Bare Ground	7.75	13.25	18.45	36.10

SOIL ANALYSIS DATA --

Management unit 22, Study no: 13, Study Name: Minersville Reservoir

Effective rooting depth (in)	Temp °F (depth)	pH	% sand	% silt	% clay	%OM	PPM P	PPM K	ds/m
11.3	67.0 (11.3)	6.3	54.0	21.4	24.6	1.0	7.1	121.6	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 22 , Study no: 13

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Rabbit	13	5	-	-
Horse	-	3	-	5 (13)
Elk	-	1	-	-
Deer	36	6	62 (153)	9 (23)
Cattle	1	7	3 (7)	20 (50)

BROWSE CHARACTERISTICS --
Management unit 22 , Study no: 13

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata wyomingensis</i>											
85	3665	-	66	2066	1533	-	15	2	42	0	26/26
91	4000	533	-	2200	1800	-	15	3	45	23	24/25
98	2780	20	140	1220	1420	1040	17	0	51	14	24/31
03	40	-	-	40	-	-	0	50	0	0	9/8
<i>Atriplex canescens</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	28/36
<i>Chrysothamnus viscidiflorus stenophyllus</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	133	-	-	133	-	-	0	50	-	0	8/7
98	40	-	-	40	-	-	0	0	-	0	13/19
03	0	-	-	-	-	-	0	0	-	0	-/-
<i>Echinocereus engelmannii</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	5/7
03	0	-	-	-	-	-	0	0	-	0	-/-
<i>Ephedra nevadensis</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	-/-
03	20	-	-	20	-	-	0	0	-	0	13/16
<i>Gutierrezia sarothrae</i>											
85	133	-	-	-	133	-	0	0	100	0	-/-
91	0	-	-	-	-	-	0	0	0	0	-/-
98	0	-	-	-	-	-	0	0	0	0	-/-
03	0	-	-	-	-	-	0	0	0	0	13/23
<i>Juniperus osteosperma</i>											
85	66	-	66	-	-	-	0	0	-	0	-/-
91	66	-	66	-	-	-	0	0	-	100	-/-
98	20	-	20	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	-/-

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Opuntia spp.											
85	66	-	66	-	-	-	0	0	-	0	-/-
91	66	-	66	-	-	-	0	0	-	0	-/-
98	40	-	-	40	-	-	0	0	-	0	6/11
03	0	-	-	-	-	-	0	0	-	0	8/19